

APPENDIX 35—SOCIOECONOMIC IMPACT ANALYSIS AND SIGNIFICANCE CRITERIA

ASSUMPTIONS AND METHODS

Significance Criteria

Significance criteria for socioeconomic impacts were determined by analyzing long-term (20-year) trends and fluctuations in certain important economic variables, including total employment and mineral ad valorem taxes associated with natural gas production for the four-county study area. This analysis evaluated these long-term trends to determine the changes likely to occur in the variables under normal conditions. Deviations from the trend over this 20-year period are considered the threshold of what can be tolerated by the regional economy for these two variables. Any changes beyond these thresholds would likely cause significant impacts to local communities.

Figure A35-1 summarizes total annual employment for the study area between 1990 and 2000. It shows that total employment followed an increasing trend (16 percent) during this period. The trend analysis also shows that the regional economy has experienced cyclical fluctuations in employment. Therefore, although total employment increased over time, it is reasonable to assume that in any given year total employment may deviate by 1 percent above or below the trend (e.g., +1,100 to -1,100 jobs).

Deviations in total employment, as measured by the historical trend, were used to define the threshold of significance for this analysis. Thus, if employment impacts due to changes in management associated with RMPPA do not exceed an increase or decrease of 1 percent of the trend, the impact is not considered significant.

The historic trend associated with mineral ad valorem taxes associated with gas production for the study area is summarized in Figure A35-2. This graph shows the estimated value, in inflation-adjusted dollars, of ad valorem taxes associated with gas production in the four-county study area. During this time ad valorem taxes have fluctuated substantially from the trend (e.g., +\$29 million to -\$27 million), and the big spike in 2000 deviated from the trend by 29 million. Given the importance of mineral ad valorem taxes to local government entities, the significance threshold for this variable was set at 15 percent above or below the trend (e.g., +\$4 million to -\$4 million).

Figure A35-1. Total Employment Trend

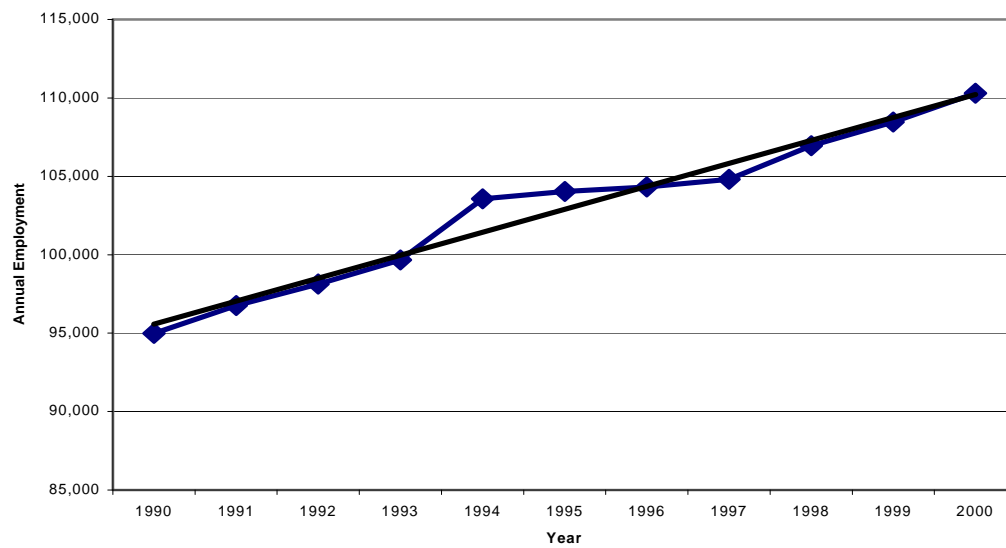
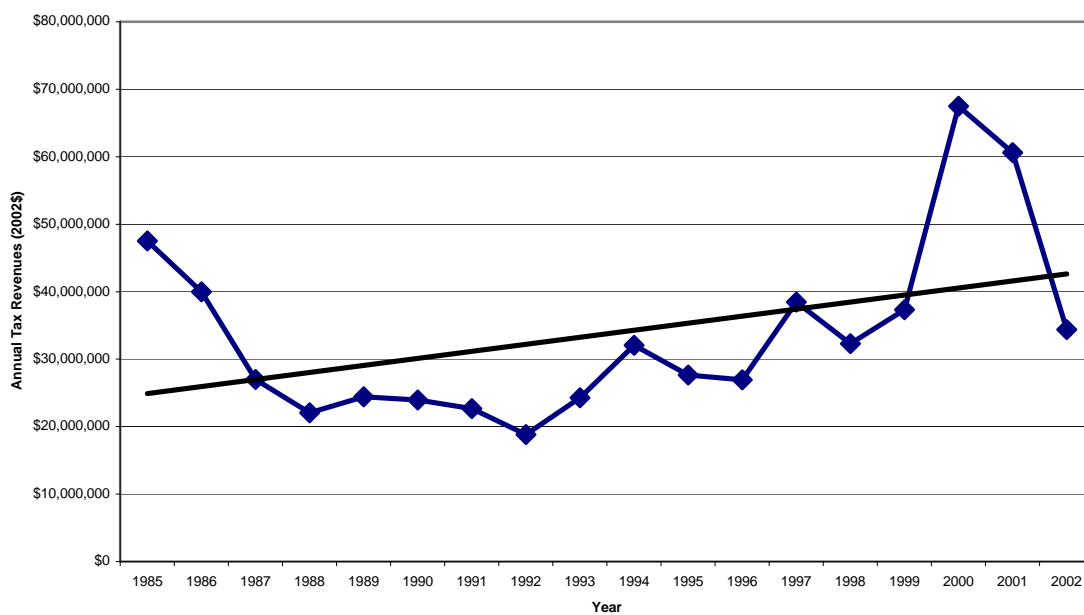


Figure A35-2. Ad Valorem Tax Trend



ECONOMIC IMPACT ANALYSIS METHODOLOGY

The following section provides a detailed summary of the economic impact analysis by resources use.

Modifications of IMPLAN for RMPPA

The Impact Analysis for PLANing (IMPLAN) modeling system is based on national production coefficients. To better reflect local production practices, the oil and gas and cattle production sectors of the four-county IMPLAN model for the Rawlins Resource Management Plan (RMP) were modified. The IMPLAN sectors associated with recreation were not adjusted because it was felt that these sectors were a reasonably accurate representation of the sectors found in the study area.

In IMPLAN, oil and gas production is separated into three sectors (MIG 2000): 38—Natural Gas and Crude Petroleum (production), 39—Natural Gas Liquids (byproducts), and 57—Maintenance and Repair of Oil and Gas Wells (oil and gas field services). Employment for these three sectors was estimated from Wyoming Department of Employment data on covered employment. These estimates were then adjusted to account for self-employment based on Wyoming data from the Bureau of Economic Analysis, U.S. Department of Commerce. Labor earnings for the three sectors were also estimated from Wyoming Department of Employment data. These estimates were then adjusted for self-employment earnings and benefits. Benefits were estimated from national data in the Survey of Current Business.

Total industry output for production was based on the quantities of production data in the Wyoming Department of Revenue's Annual Report, and price forecasts from the Wyoming Consensus Revenue Estimating Group (CREG). Total industry output for byproducts was estimated from information on county gas plant products from Minerals Management Services. Total industry output for oil and gas field services was estimated using output/employment ratios developed from the 1997 Economic Census, U.S. Census Bureau. Because of the large price fluctuations in natural gas and oil prices, the economic impacts of production were estimated based on cost of production rather than total output.

In IMPLAN, the cattle ranching industry is separated into two sectors: 3—Ranch Feed Cattle, and 4—Range Feed Cattle. Sheep production is represented by a single sector: 6—Sheep, Lambs, and Goats. For this analysis, sectors 3 and 4 were combined into a single Cattle Ranching sector. The production coefficients for this aggregated cattle ranching sector were then modified based on a University of Idaho Cow-Calf Budget. It was felt that this budget was a more accurate reflection of production practices in the study area. The sheep sector production coefficients were not modified. Because of price fluctuations, the 1992–2001 average value of production estimates from the Wyoming Agricultural Statistics was used to estimate per animal unit month (AUM) values for both cattle and sheep production. The quantity of production was estimated based on Wyoming Agricultural Statistics data on cattle and sheep inventories by county. Hay production was also adjusted to reflect current production in the study area. Finally, regional purchase coefficients were adjusted to reflect current purchasing patterns in the study area.

Oil and Gas Exploration and Development

The economic impact of oil and gas operations was analyzed in two phases:

- Phase I: Exploration and Development
- Phase II: Production.

Phase 1 considered how many exploratory and development wells would be drilled under each alternative in RMPPA and what percentage of these wells would be completed, including both conventional wells

and coalbed natural gas development. Table A35-1 summarizes the economic assumptions used in analyzing the exploration and development phase associated with each alternative. Oil production was considered a byproduct of gas production.

Table A35-1. Economic Assumptions for Gas Exploration and Development

Impacts/Well	Coalbed Natural Gas			Conventional Wells		
	Shallow	Deep	Dual ^a	Intermediate	Dual ^b	Deep
Drilling Cost	\$100,000	\$250,000	\$144,313	\$500,000	\$625,000	\$3,000,000
Completion Cost	\$100,000	\$250,000	\$144,313	\$500,000	\$625,000	\$3,000,000
Drilling Jobs	1.3	3.2	1.8	6.3	7.9	37.9
Completion Jobs	0.6	1.5	0.9	3.0	3.7	18.0
Drilling Earnings	\$39,599	\$99,220	\$57,346	\$198,886	\$248,496	\$1,191,980
Completion Earning	\$18,664	\$47,329	\$27,305	\$94,211	\$117,876	\$565,269
Completion Rate	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
Completion Rate— Exploratory	-	-	-	90.0%	-	90.0%

^a Dual CBNG wells are two wells drilled from the same pad.

^b Dual intermediate gas wells are two wells drilled from the same pad.

Phase II considered the economic impact of producing additional gas reserves as a result of the exploration and development under Phase I. Table A35-2 summarizes the economic assumptions used to analyze gas and oil production estimated to occur under each alternative.

Table A35-2. Economic Assumptions for Oil and Gas Production

Inputs/Impacts	Type of Wells	
	Conventional	CBNG
Price/MMCF ^a	\$3,250	\$3,250
Price/MMBO ^a	\$20,500,000	\$20,500,000
Labor Earnings	\$197.52	\$197.52
Employment	0.0052	0.0052

^a Prices for natural gas and oil were obtained from the Wyoming State Consensus Revenue Estimating Group, October 2003.

^b The Labor Earnings and Employment entries are the Total Earnings and Employment per MMCF.

The average price of natural gas and oil used for this analysis was obtained from the Wyoming State Government Revenue Forecast for 2004 through 2008. The average price forecast for natural gas for 2004 and beyond was estimated at \$3.25 thousand cubic feet (\$/mcf) and for oil at \$20.50 billion barrels (\$/bbl).

Grazing

Grazing activities were analyzed under each alternative as follows. First, BLM was contacted concerning historical grazing use within the RMPPA. The value of grazing AUMs for cattle and sheep was estimated as summarized in Table A35-3 and Table A35-4.

Table A35-3. Estimated Value of Cattle AUMs

Year	Value of Production (1,000\$s) ^a	Cows that have Calved (1,000 Head) ^a	Value Per Cow	Conversion to AUMs (AUMs/cow) ^b	Value of Production Per AUM Nominal\$s	Value of Production Per AUM Real (2001\$)
1998	\$400,637	880	\$455.27	16	\$28.45	\$30.10
1999	\$452,058	830	\$544.65	16	\$34.04	\$35.55
2000	\$490,707	830	\$591.21	16	\$36.95	\$37.80
2001	\$542,823	850	\$638.62	16	\$39.91	\$39.91
2002	\$444,815	820	\$542.46	16	\$33.90	\$33.11
					5-year Average	\$35.29

^a Wyoming Agricultural Statistics

^b J.P. Workman, *Range Economics* (New York: Collier Macmillan, 1986).

Table A35-4. Estimated Value of Sheep AUMs

Year	Value of Production (Sheep and Lambs) (\$1,000) ^a	Value of Wool Production (\$1,000) ^a	Total Value of Production (\$1,000) ^a	Ewes 1 Year and Older (1,000 Head) ^a	Value Per Ewe	Conversion to AUMs (AUMs/Ewe) ^b	Value of Production Per AUM Nominal \$	Value of Production Per AUM Real 2001 \$
1998	\$24,493	\$4,266	\$28,759	430	\$66.88	3.2	\$20.90	\$22.11
1999	\$22,489	\$2,416	\$24,905	385	\$64.69	3.2	\$20.22	\$21.11
2000	\$23,448	\$2,143	\$25,591	365	\$70.11	3.2	\$21.91	\$22.42
2001	\$19,155	\$2,015	\$21,170	340	\$62.26	3.2	\$19.46	\$19.46
2002	\$21,412	\$2,738	\$24,150	320	\$75.47	3.2	\$23.58	\$23.03
							5-year Average	\$21.63

^a Wyoming Agricultural Statistics^b J.P. Workman, *Range Economics* (New York: Collier Macmillan, 1986).

The economic analysis used the 5-year average value of AUMs, or \$35.29/AUM for cattle and \$21.63 for sheep, in inflation-adjusted dollars. The value and number of AUMs per alternative were then used in combination with the IMPLAN model to estimate economic impacts of grazing under each alternative. The economic assumptions used to analyze grazing impacts are summarized in Table A35-5.

Table A35-5. Economic Assumptions for Grazing

	Cattle Grazing (2001 \$)	Sheep Grazing (2001 \$)
Production Value per AUM	\$35.29	\$21.63
Total Economic Impact per AUM	\$64.36	\$42.36
Earnings per AUM	\$18.77	\$5.83
Jobs per AUM	0.000709	0.000951

Recreation

Recreational impacts were analyzed as follows. The number of recreation visitor days (RVD) was estimated for each alternative, considering several assumptions. These assumptions are summarized in Table A35-6. Once the number of RVDs was estimated by activity, the RVDs were separated into resident and nonresident use and analyzed separately. Residents were considered as any individual living in the four-county study area, whereas nonresidents live outside the four-county region. Residents of the study area associated with big game hunting were determined by evaluating zip codes of hunters that applied for licensees from the Wyoming Game and Fish Department (WGFD) within the relevant hunting areas. Residents and nonresidents participating in off-highway vehicle (OHV) and other dispersed use were based on observations of BLM staff for this area.

The economic impact of recreation in the RMPPA considered activities of nonresidents only. Regional economic impact modeling (Input/Output [I/O] models) evaluates the additional economic activity associated with “new” money brought into an economy, which can occur as goods and services are produced by local firms and exported to entities outside the region (e.g., agricultural products, oil and gas production). In addition new money can come into an economy as visitors come to the area and spend money. I/O models estimate the additional economic activity that occurs with new money expenditures. Therefore, nonresident spending is evaluated when determining the economic impacts of recreation. However, this does not imply that recreational activities are not important to the quality of life of residents in the area.

Total annual recreational expenditures of nonresidents were estimated for each alternative using the estimated RVDs per activity and the average expenditures per day per activity. Table A35-7 summarizes the average expenditures used for each activity. The economic assumptions used to estimate recreational impacts are summarized in Table A35-8.

Table A35-6. Recreation Assumptions

Use Type	Alternative 1	Alternative 2	Alternative 3	Alternative 4—Proposed Plan
Nonconsumptive				
OHV	OHV use is estimated to increase 1.5% per year during the planning period, based on current trends in OHV use.	OHV use is expected to increase 3% per year. Increases in OHV use are expected as a result of the creation of the Rawlins OHV SRMA. An increase is also expected in the number of roads and vehicle routes open to OHV use because of changes in wildlife management restrictions and increased mineral development.	OHV use is expected to increase only 1% per year. Although the Rawlins OHV SRMA is expected to increase OHV use, restrictions in other SRMAs, as well as other wildlife restrictions, would reduce the number of roads and vehicle routes open to OHV use.	OHV use is estimated to increase 1.5% per year during the planning period, based on current trends in OHV use.
Other Recreational Uses	Nonconsumptive RVDs are estimated to increase 1.5% per year over the study period, based on current trends.	Nonconsumptive RVDs are expected to decline 1.5% over the study period because of a reduction in, or substantial changes to, wildlife and fisheries habitat in the RMPPA.	Nonconsumptive RVDs are expected to increase by 2.5% per year over the study period as a result of increased protection for wildlife and fisheries resources.	Nonconsumptive RVDs are estimated to increase 1.5% per year over the study period, based on current trends.
Consumptive				
Fishing	Fishing RVDs are expected to increase 2% per year, based on current trends.	Fishing RVDs are expected to stay constant at the 5-year historic average.	Fishing RVDs are expected to increase by 2.5% per year as a result of changes in vegetation management, protection of riparian areas, and protection of wildlife and fish resources.	Fishing RVDs are expected to increase by 2% per year, based on current trends
Elk	Elk hunting is expected to remain constant at the current 5-year average for the Rawlins RMPPA.	Elk hunting is expected to decline 1% per year during the study period as a result of impacts on wildlife from increased mineral development, changes in vegetation management, and increased OHV use.	Elk hunting is expected to increase as a result of changes in vegetation management, protection of riparian areas, and protection of wildlife habitat, resulting in an increase in RVDs of 0.5% per year.	Elk hunting is expected to remain constant at the current 5-year average for the Rawlins RMPPA.

Use Type	Alternative 1	Alternative 2	Alternative 3	Alternative 4—Proposed Plan
Antelope	Antelope hunting is expected to remain constant at the current 5-year average for the Rawlins RMPPA (or increasing a little).	Antelope hunting is expected to decline 1% per year during the study period as a result of impacts on wildlife from increased mineral development, changes in vegetation management, and increased OHV use.	Antelope hunting opportunities are expected to increase, resulting in an increase in RVDs by 0.5% per year.	Antelope hunting is expected to remain constant at the current 5-year average for the Rawlins RMPPA (or increasing a little).
Mule and White-Tailed Deer	Deer hunting is expected to remain constant at the current 5-year average or decline slightly for the Rawlins RMPPA. Declines would be caused by increased occurrences of chronic wasting disease in the area and loss of sagebrush steppe communities, which hurts winter range availability.	Deer hunting is expected to decline 1% per year during the study period as a result of impacts on wildlife from increased mineral development, changes in vegetation management, and increased OHV use.	Same as Alternative 1	Same as Alternative 1
Water Fowl	Water fowl hunting is expected to remain constant at the current 5-year average for the Rawlins RMPPA.	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1

Table A35-7. Summary of Visitor Expenditures

Summary of Daily Visitor Expenditures	Per Person Per Day
Nonresident OHV Use	119.13 ^a
Nonresident Hunting	116.31 ^b
Nonresident Other Nonconsumptive Uses	33.27 ^c

^a Hazen and Sawyer, *Economic Contribution of Off-Highway Vehicle Use in Colorado*, Prepared for the Colorado Off-Highway Vehicle Coalition, Denver, CO, July 2001.

^b Morey & Associates, Inc., *Report on the Economic Impact of the Travel Industry in Wyoming—1998*, prepared for the Wyoming Business Council, Division of Tourism, Cheyenne, WY, 1999.

^c U.S. Fish & Wildlife Service, *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation—Wyoming*, FHW/01-WY, Rev., 2003.

Table A35-8. Economic Assumptions for Recreation

	OHV (2001 \$)	Other Nonconsumptive Uses	Hunting (2001 \$)
Direct Expenditures			
Jobs Per \$1M	27.5	31.9	44.3
Earnings Per \$1M	\$413,864	\$359,448	\$436,798

LITERATURE CITED

Minnesota IMPLAN Group (MIG), 2000. IMPLAN Professional, Version 2.0, User's Guide.